Computational Toxicology
Overview

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Computational Toxicology
Overview

Outline

- EPA's Science Policy Council Interim Policy
- EPA Context for Comp Tox Program
- Challenges

RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

Science Policy Council's Charge

- Develop Interim Policy
- Develop an Action Plan to address technical and policy challenges for appropriate use of genomics technologies and data in EPA

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EPA Interim Policy

- EPA encourages and supports continued genomics research as a powerful tool for understanding the molecular basis of toxicity and developing biomarkers of exposure, effects, and susceptibility
- Genomics data alone are currently insufficient as a basis for risk assessment and management decisions

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EPA Interim Policy - continued

- Limited use while Agency gains experience in assessing the quality, accuracy, and reproducibility and relevance of the data
- May be useful in a weight-of-evidence approach for human health and ecological risk assessments

www.epa.gov/osp/spc/genomics.htm

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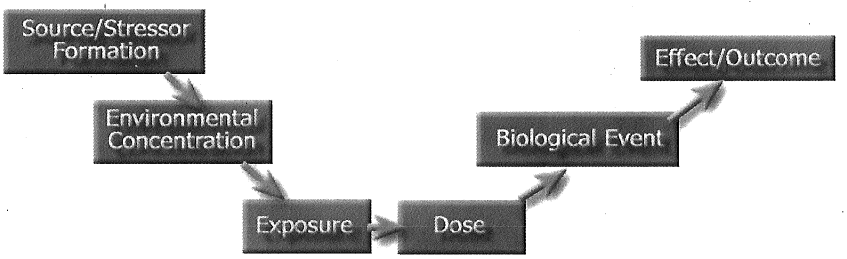

EPA Context: Quantitative Risk Assessment/ Risk Management for Priority Pollutants

- Methods to Detect & Characterize
- Evaluate Single Chemical at a Time

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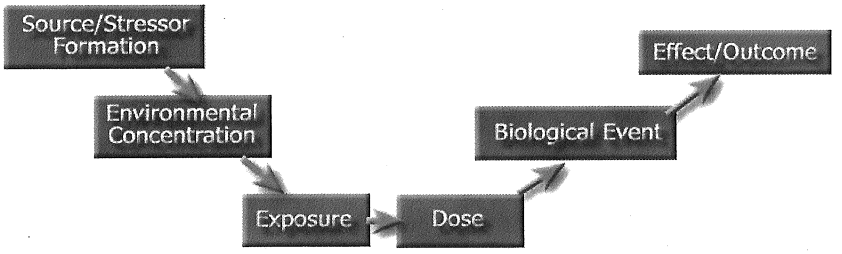

PROGRAMMATIC CHALLENGES

- Many Priority Lists Already in Queue (e.g., EDC's, Pesticide Inerts, HPV's, CCL) with No Risk-Based Criteria for Setting Testing Priorities
- Different Authorities – Different Testing Requirements with No Scientific Basis for Flexible Testing Approaches
- Lack Data Needed to Reduce Uncertainties by Quantitative Risk Assessments (e.g., extrapolations)

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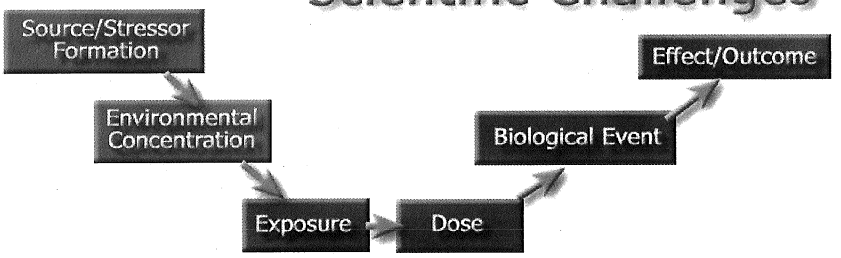
Scientific Challenges



- Delineate Toxicity Pathways
- Extend Cross- and Within-Species Extrapolations
- Identify Endpoints for QSAR Models

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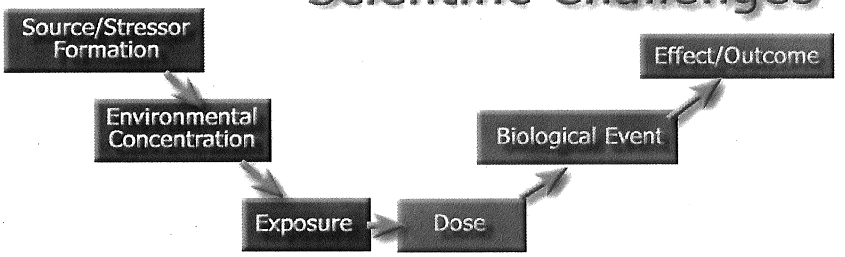
Scientific Challenges



- Exposure Biomarkers
- Fate/Transport Models

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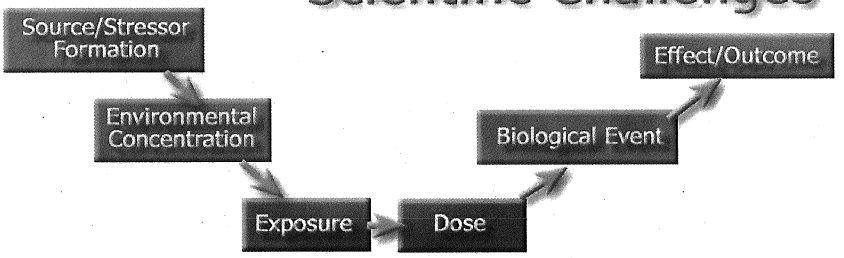
Scientific Challenges



- Dose Metrics
- Understanding Cross- and Within-Species Variations in Pharmacokinetics

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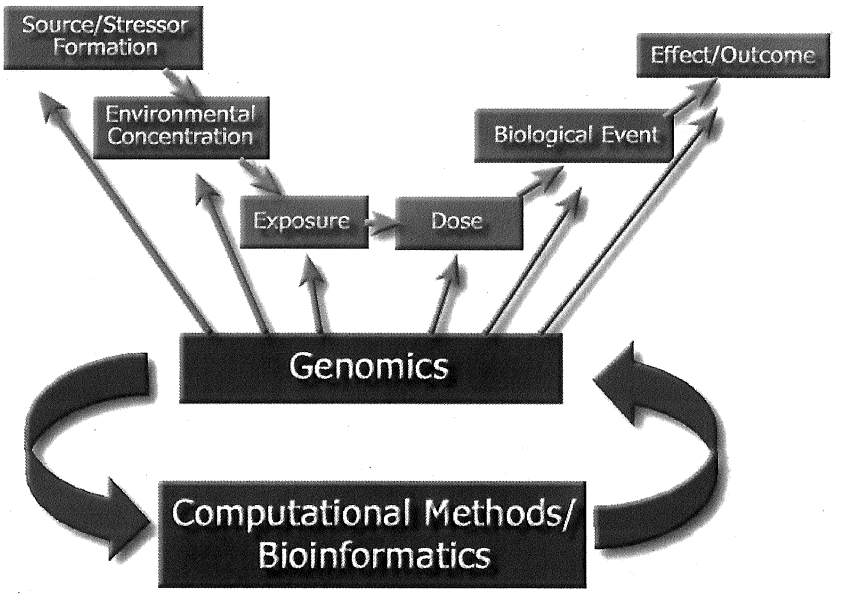

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To integrate modern computing and information technology with the technology of molecular biology and chemistry to improve EPA's prioritization of data requirements and risk assessments for toxic chemicals